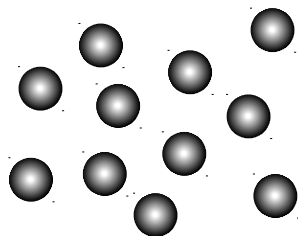


## Single Atoms

(monatomic elements)

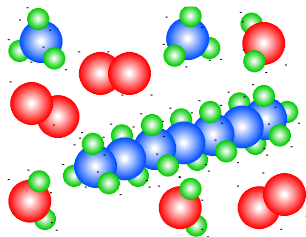
Very rare - only the *Noble Gases* exist as single atoms



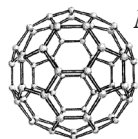
He Ne Ar Kr Xe

## Covalent Molecular

(non-metal elements & compounds)



*Small* - H<sub>2</sub> O<sub>2</sub> N<sub>2</sub> etc  
HCl H<sub>2</sub>O NH<sub>3</sub> CH<sub>4</sub>



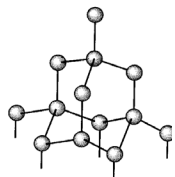
*Medium* - C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>  
C<sub>6</sub>H<sub>14</sub> C<sub>60</sub>

*Large* - starch  
polythene etc

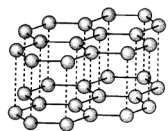
## Covalent Network

(non-metal elements & compounds)

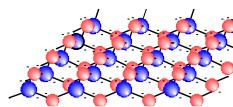
Only 3 examples



the *element*  
carbon  
(diamond)



the *element*  
carbon  
(graphite)

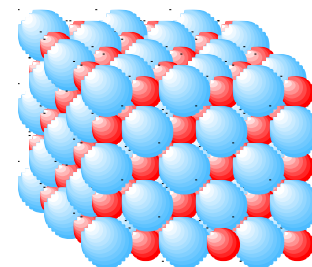


the *compound*  
SiO<sub>2</sub>

## Ionic Network

(metal/non-metal compounds)

All metal/non-metal  
*compounds*

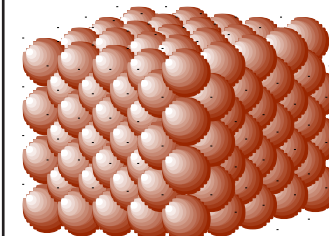


Na<sup>+</sup> Cl<sup>-</sup>  
Mg<sup>2+</sup> O<sup>2-</sup>  
Cu<sup>2+</sup> (NO<sub>3</sub>)<sub>2</sub>

## Metallic Network

(metal elements & alloys)

All metal/non-metal  
*compounds*



Cu Na  
Mg Fe  
brass

### Conductivity

*Solid* - **NO**  
*Liquid* - **NO**  
*Solution* - **NO**

### Conductivity

*Solid* - **NO**  
*Liquid* - **NO**  
*Solution* - **NO**

### Conductivity

*Solid* - **NO** \*  
*Liquid* - **NO**  
*Solution* - **NO**  
\* except for graphite

### Conductivity

*Solid* - **NO**  
*Molten* - **Yes**  
*Solution* - **Yes** \*  
\* if soluble (Data Book)

### Conductivity

*Solid* - **Yes**  
*Liquid* - **Yes**  
*Solution* - *insoluble*

### Melting / Boiling

*MPt* - extremely  
low  
*BPt* - extremely  
low  
All Gases

### Melting / Boiling

*MPt* - very  
low  
*BPt* - very  
low  
Gases, Liquids, Solids

### Melting / Boiling

*MPt* - extremely  
high  
*BPt* - extremely  
high  
All Solids

### Melting / Boiling

*MPt* - extremely  
high  
*BPt* - extremely  
high  
All Solids

### Melting / Boiling

*MPt* - high to  
very high  
*BPt* - high to  
very high  
All Solids (except Hg)